

## **REMARKS**

This Amendment is submitted in response to the Examiner's Action dated February 5, 2005, Favorable reconsideration of this application is respectfully requested for the reasons set forth in these remarks.

### ***Claim Rejection – 35 U.S.C. § 103***

Claims 1 – 10 are rejected under 35 U.S.C. § 103, as being unpatentable over *Batchelder* (US 5,054,107) in view of *Vischer* (US 4,032,748). Specifically, the Examiner asserts that *Batchelder* discloses the claimed invention including a heater for heating fluid comprising at least one radiant energy source; a vessel for carrying a fluid to be heated wherein said vessel is coiled around said radiant energy source; a reflecting chamber surrounding said vessel and said radiant energy source; at least one device for monitoring the temperature of said fluid at the outlet end of said vessel; and at least one control device for adjusting the radiation emitted from said radiant energy source in response to changes in the temperature recorded by said device for monitoring the temperature of said fluid, a thermocouple is encased in an inert casing and immersed in the process fluid at the outlet end of the quartz coil for controlling the flow and/or heating of the radiant heat source. *Vischer* discloses using a coiled PTFE tube in a device comprising an electric heating element used to heat fluid within the tube so as to allow for expansion and contraction of the coiled tube.

### ***Discussion of Cited Art***

A better understanding of the reasons Applicant believes that Applicant's invention is patentable over *Batchelder* in view of *Vischer* can be obtained by more closely examining the cited art. *Batchelder* teaches a fluid heating system in which fluid flows through quartz tubing while absorbing radiation from infrared or longer wavelength lamps. In fact, it is clear that

quartz is a necessary material for the *Batchelder* invention. Specifically, *Batchelder* teaches that “[t]he quartz comprising the coil is selected to transmit the lamp radiation efficiently to the fluid within the coil. Because most quartz will efficiently transmit radiation having wavelength in the range from about 0.5 microns to about 5 microns, most of the radiation emitted by the lamps will preferably be infrared radiation having wavelength within this range.” *Batchelder*, col. 3, lines 3 – 10. Moreover, *Batchelder* states that conventional heat exchange systems are inefficient when compared to radiation heating systems employing a quartz coil. *See, e.g., Batchelder* col. 2, lines 9 – 14. There is no teaching to suggest that other materials, such as materials utilized in conventional heat exchange systems, may be used in lieu of quartz tubing and, to the contrary, the discussion in the specification teaches away from the use of other materials.

The invention disclosed in *Vischer* is entirely unrelated to the Applicant’s invention. *Vischer* teaches heating of liquid through the use of a heat exchange system, not through a radiation system such as that taught by the Applicant. *Vischer* incorporates a PTFE tube within a metallic heat exchange member, the purpose of which is to expand and contract, both linearly and diametrically, within the heat exchange member so as to loosen deposited salt crystals from the surface of the PTFE tube. Even if *Vischer*’s selection of PTFE was applicable to a radiation heating system, which Applicant respectfully asserts it is not, the characteristics and properties that persuaded *Vischer* to select PTFE, namely its expansion coefficient, are entirely unrelated to the properties for which the Applicant has selected PTFE. There is no discussion within the *Vischer* specification of the selection of PTFE for its inert properties. Moreover, there is no discussion in *Vischer* about the drawbacks of using quartz when heating inert liquids and the desirability of using PTFE in such a system.

Applicant respectfully asserts that the present invention is patentable over *Batchelder* in view of *Vischer* for at least the reasons set forth below.

***No Basis in the Art for Combining References***

First, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching, suggestion or incentive supporting the combination. *ACS Hospital Systems, Inc. v. Monteffiore Hospital*, 732 F.2d 1572, 1577 (Fed. Cir. 1984). In fact, the Federal Circuit has recently held:

“most, if not all, inventions arise from a combination of old elements. . . . Thus, every element of a claimed invention may often be found in the prior art. However, identification in the prior art of each individual part claimed is insufficient patentability of the whole claimed invention. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.”

*In re Kotzab*, 217 F.3d 1365 (Fed. Cir. 2000).

Recently, in *In re Lee*, the court has cautioned against asserting that a combination of references was “common knowledge” or “common sense.”

“The ‘common knowledge and common sense’ on which the Board relied in rejecting *Lee*’s application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. . . . The Board’s findings must extend to all material facts and must be documented on the record lest the ‘haze of so-called expertise’ acquire insulation from accountability. ‘Common knowledge and common sense,’ even if assumed to derive from the agency’s expertise, do not substitute for authority when the law requires authority.”

*In re Lee*, 277 F.3d 1338, 1343 (Fed. Cir. 2002).

In the present case, the Applicant selected PTFE rather than quartz for the tubing for at least one specific reason. Certain heat exchangers are designed for use with certain liquids that

are antagonistic to quartz. For example, hydrofluoric acid (HF), a material that is very useful for etching silicon dioxide, SiO<sub>2</sub>, a material used extensively in semiconductor manufacturing environments because it can easily be masked by photoresist; the etch rate is quite repeatable and remains constant even after a large number of samples have been etched; and the equipment required to etch with HF is relatively simple and inexpensive. A significant obstacle to the use of HF, however, is that it also etches quartz. For this reason, it is undesirable to use quartz tubing in a heat exchange system for heating HF.

As discussed above in the *Discussion of Cited Art*, *Batchelder* teaches away from the use of materials other than quartz: “[t]he quartz comprising the coil is selected to transmit the lamp radiation efficiently to the fluid within the coil. Because most quartz will efficiently transmit radiation having wavelength in the range from about 0.5 microns to about 5 microns, most of the radiation emitted by the lamps will preferably be infrared radiation having wavelength within this range.” *Batchelder*, col. 3, lines 3 – 10. *Vischer* teaches the use of PTFE in a heat exchange system (not a radiation heating system as taught by *Batchelder*) for its scale removal properties and does not teach or even suggest the use of PTFE for processing inert fluids. Accordingly, one of ordinary skill in the art who was looking to improve the efficiency of radiation heating systems used for ultrapure liquids would not consider using PTFE coils based on the teachings in the *Vischer* patent. There is simply no teaching, suggestion or incentive to do so.

***References Are Not Properly Combinable If Their Intended Function Is Destroyed***

The Federal Circuit has consistently held that when a rejection under § 103 is based upon the modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and a *prima facie* case of obviousness cannot be made. See, e.g., *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984) (“The mere

fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.”)

In the present case, Applicant teaches and claims the use of PTFE and other materials in a radiation heating environment. *Batchelder* does not teach that it would be desirable to use PTFE or similar materials in a radiation-heating environment. In fact, as discussed above, *Batchelder* teaches that quartz is superior over other materials.

*Vischer* teaches the use of PTFE for its scale removal properties in a heat exchange system (not a radiation heating system as taught by *Batchelder*) and does not teach or even suggest the use of PTFE for processing ultrapure fluids. Accordingly, although it is technically possible to substitute PTFE for the quartz coil used in *Batchelder*, the desirability of such a modification was not suggested in either *Batchelder* or *Vischer* and it would not have been obvious to one of ordinary skill in the art who was looking to improve the efficiency of radiation heating systems used for ultrapure liquids.

***Prima Facie Obviousness Requires A Reasonable Expectation of Success***

The courts require that some reason or suggestion must be found in the prior art or other evidence of record that would have led one of ordinary skill in the art to produce the claimed invention in order to properly establish a *prima facie* case of obviousness. For example, in *In re Clinton*, 527 F.2d 1226, the CCPA stated that “obviousness does not require absolute predictability but a reasonable expectation of success is necessary.” The court went on to say that, “in going from the prior art to the claimed invention, one cannot base obviousness upon what a person skilled in the art might try or might find obvious to try but rather must consider what the prior art would have led a person skilled in the art to do.” Accordingly, obviousness

cannot be surmised when there is no suggestion, or expressed expectation, of success in the prior art that would have led one to perform the experimentation in the first place.

*Batchelder* teaches a radiation heating system with a quartz coil for use in heating ultrapure liquids. *Vischer* teaches a heat exchange system with a PTFE inner coil for use in eliminating scale deposits when heating unpure liquids. Nowhere in either patent is there a suggestion or an expressed expectation that the PTFE inner coil used in the scale deposit removal system of *Vischer* could replace the quartz coil in the radiation heating system of *Batchelder* to successfully arrive at a PTFE coil in a direct infrared heating system.

***Non-analogous Art Cannot Be Used To Establish Obviousness***

35 U.S.C. § 103 requires that obviousness be determined on the basis of whether, at the time the invention was made, a person of ordinary skill in the art to which the subject matter pertains would have found the claimed invention as a whole obvious. For example, in *In re Pagliaro*, 657 F.2d 1219 (CCPA 1981), the court ruled that a *prima facie* case of obviousness had not been made because non-analogous prior art had been relied upon. The invention at issue was a process for decaffeinating coffee by contacting ground coffee with a liquid, water immiscible fatty material in which the caffeine was preferentially soluble, followed by the removal of the caffeine-laden fatty material. The claimed invention was an improvement over the prior art decaffeinating processes because there was no requirement for the use of toxic solvents as a medium for extracting the caffeine. The prior art relied upon by the Patent Office related to a comparison of diuretic solubilities in oil/serum as opposed to oil/water mixtures. The court found that the reference was not concerned with the preparation of a drink or the problem of decaffeinating coffee, which was faced by the inventor. Thus the court held that there was no common environment that could form a “close relationship” between either the claimed

invention or the prior art, on one hand, and the cited reference, on the other, to logically require consideration of the cited reference.

Similarly, the art taught by *Vischer* relates to a scale deposit removal system for unpure liquids in electric water heaters and vaporizers using heat exchange technology. *Batchelder* and the Applicant's invention both relate to radiation heating systems for ultrapure liquids and are unconcerned with solving the problems addressed by scale deposits. In fact, because both *Batchelder* and the Applicant teach heating methods for ultrapure liquids, they are unconcerned about addressing problems relating to scale buildup. The *Vischer* reference cited by the Examiner is simply non-analogous art with no common environment that could form a "close relationship" with the inventions taught by *Batchelder* or the Applicant.

Similarly, in *In re Clay*, 966 F.2d 656 (Fed. Cir. 1992), the Federal Circuit held that the prior art process references to be non-analogous to the claimed invention even though both were used in the petroleum industry and both involved handling petroleum products in volumetric enclosures. In that case, the court said that because the references show a different "field of endeavor" and different "purposes," they defeat the possibility of dealing with a common problem and, therefore, are non-analogous art.

In the present case, the problem being solved by *Vischer* is the removal of scale deposits in heat exchange systems used for heating unpure liquids. This is clearly a different "field of endeavor" and a different "purpose" than the improved radiant heating system taught by *Batchelder* and the Applicant. Accordingly, the *Vischer* reference is non-analogous art and is not properly combinable with *Batchelder* to form a rejection of the Applicant's invention under § 103.

In view of the foregoing remarks, the Applicant respectfully submits that all pending claims are allowable over the art of record and respectfully requests a timely Notice of Allowance.

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Respectfully submitted,



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